Design and Prototype of a Laboratory Display Module for the UNC Hospital's Clinical Workstation

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This program demonstrates the final prototype of a software module for the Clinical Workstation. It was designed to provide physicians, nurses and other health care professionals with a laboratory results display that is both comprehensive and applicable throughout the UNC hospital environment yet is customizable enough for the task requirements of different departments and practitioners. The ultimate goal is to provide a laboratory display system that helps its diverse groups of users perform their tasks quickly and effectively.

This module is being implemented as part of an iterative software design process which consists of a cycle of design, prototyping and implementation. Evaluation of existing design is incorporated into each step of this development cycle. The prototype shown is the result of our final effort prior to the initial installation into the hospital environment. Constraints for the design dictated the final system be implemented in a Windows environment with monitor color depth and resolution limitations. The prototype was therefore developed using Microsoft Visual Basic v. 3.0 . to simulate as closely as possible the final product (which will be implemented in C++) while making a rapid prototype possible.

The first task in our design was to describe the users of this system and investigate their goals in utilizing laboratory results. These goals were elucidated using scenarios written for each major group of users. For the Clinician's Workstation, most of the end users of the system, although varied in their tasks, had in common patient monitoring as their primary goal. This is in contrast to a smaller number of the clinical faculty who use the results of laboratory tests to investigate unknown or problematic patient care issues. This finding led to the first and overriding design decision for the display module: the organization of the display would focus on the most frequently ordered laboratory tests. The results of this decision can be seen in the organization of the folders present in the display prototype. The main screen contains windows for Chemistry electrolyte panels, Hematology CBC panels with differential and Microbiology cultures and sensitivities. The second folder display screen will display all other tests within the same three main laboratory categories. All results in both folders are displayed in descending chronological order. To further enhance the patient monitoring capabilities a graphical time trend display was also included that can incorporate multiple tests or test panels. The investigative aspect of user tasks is enhanced by the addition of a third display folder for querying specific test results.

To facilitate the user and location specific tasks within the hospital-wide system served by the Clinical Workstation, the final folder in the module will contain specific test panel displays and an ability to create a personalized test panel for individual use. The standard test panels were designed using test frequency data from each department along with user interviews to facilitate widespread acceptance of the system.

Usability specifications were also incorporated into the prototype design to provide input during final product development. We hope that with such a rapidly extensible and flexible prototype in place the continuing cycle of evaluation and testing during implementation will proceed smoothly.

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